Consider the following problem:

$\log(x^2)=4$

One student wrote:

$\log(x^2)=2\log(x)$

$2\log(x)=4$

$\log(x)=2$

$x=10^2=100$

If the problem were worth 4 points, how many of those 4 points would you award the student and why?

$10^{2\log x}=10^4$

$(10^{\log x})^2=10^4$

$(x)^2=10^4$

$10^{\log(x^2)}=10^4$

$x^2=10^4$

$x=\pm\sqrt{10^4}$

$=\pm 100$

2] $\log(a^2\sqrt{bc}) = \log[(a^2)(\sqrt{b})(\sqrt{c})]$

$\sqrt{b} = b^{(\frac{1}{2})}$

$= \log a^2 + \log\sqrt{b} + \log\sqrt{c}$

$= 2\log a + \frac{1}{2}\log b + \frac{1}{2}\log c$

$= 2(4) + \frac{1}{2}(2) + \frac{1}{2}(3) = 10.5$

7) $\ln(x) = -2.4$

$\ln\left(\frac{x^2 \sin(x)}{\sqrt{x^2+1}}\right) =$

$\ln x = -2.4$

$x = e^{-2.4}$

$x^2 = (e^{-2.4})^2$

$\ln x^2 + \ln \sin(x) - \ln\sqrt{x^2+1}$

$= 2\ln x + \ln \sin x - \frac{1}{2}\ln(x^2+1)$

$= 2(-2.4) + \ln \sin(-2.4) - \frac{1}{2}\ln(e^{-4.8}+1)$

4.1) roots, factors, zeros, x-intercepts, solutions

$$P(x) = Q(x) \cdot D(x) + R(x)$$

in particular . . .

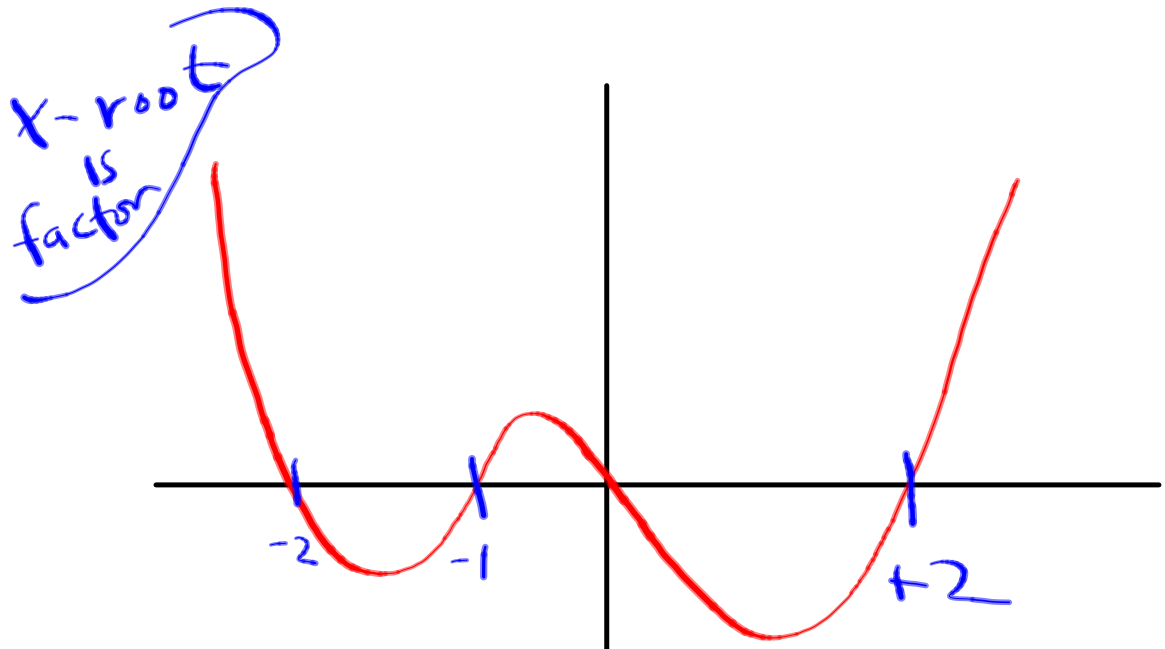
if $x = c$ is a zero (solution of $P(x)=0$)

then

$$P(x) = Q(x) \cdot (x - c) + R(x)$$

AND

$$P(c) = R(c) = 0$$



$$y = A(x+2)^3(x+1)(x)(x-2)$$

4.2 How do I find zeros of P(x)?

* c is a zero if P(c) = 0

* c is a REAL zero then
  * c is irrational, OR
  * c is rational $\left(\frac{r}{s}\right)$

irrational
- π
- e
- $\sqrt{b}$ if b is not a perfect sq.

[[irrational number is a # that is Not rational]]

rational #s [[fractions]] are
* terminating decimals
* repeating decimals

When is c a rational zero?

If $\frac{r}{s}$ is a rational root of $P(x) = a_n x^n + a_{n-1}x^{n-1} + \dots + a_2 x^2 + ax + a_0$

then r divides a_0
and s divides a_n

Find rational roots of:

$$2x^4 + x^3 - 17x^2 - 4x + 6$$

$\frac{r}{s}$: r divides $6 \Rightarrow 1, 2, 3, 6$
s divides $2 \Rightarrow 1, 2$

possible $\frac{r}{s}$: $\pm\frac{1}{1}, \pm\frac{2}{1}, \pm\frac{3}{1}, \pm\frac{6}{1}$

$x^2 + 8x + 7$
$(x+7)(x+1)$
$x = -1, -7$

$\pm\frac{1}{2}, \cancel{\pm\frac{2}{2}}, \pm\frac{3}{2}, \cancel{\pm\frac{6}{2}}$

$Y_1 = 2x^4 + x^3 - 17x^2 - 4x + 6$

2nd Quit

$Y_1(1) = 0$?

$Y_1(-1) = 0$?

Y_1? VARS → ENTER SELECT